# HIGH-END TECHNOLOGY FOR DIGITAL PRINTING ON EDGE-BANDING MATERIAL

## Dr Anke Pankoke expands on the potential of industrial ink-jet for production efficiency and décor quality

**Almost everyone had to do it once – applying an edge belt on a furniture part with an electric iron. Or you were happy about not having to do it yourself because you bought a finished worktop with a high-quality edge. In both cases, it isn't necessary to come to a compromise with regard to optics. Thanks to digital printing, each décor request for surface and edge can be realised in high end quality.**

As a machine and plant engineering company with focus on the woodworking industry, Hymmen has extensive know-how about the complete production procedures required by its customers. Due to the close interaction with them regarding the furniture and kitchen industry, very soon Hymmen developed a special field of application for its industrial digital printing technology for which there had been no solution on the market before. (For example, the industrial digital printing on edge belts, compare figure 1).

### THE ADVANTAGES OF DIGITAL PRINTING ON EDGE BANDS

The substitution of gravure printing by digital printing provides a lot of advantages for customers: The digital printing can be incorporated in existing process chains of the décor industry as it enables individualised mass production, the quick reaction to market trends and customer requests, a shorter time to market, faster set-up times, lower storage costs, no material loss upon change of decor and, last but not least, new design options with regard to register lengths, levels of detail, and so forth. On request, this is matched 1:1 to the décor of the board surface – possibly finished by the same company. (For comparison of gravure printing and digital printing, see figure 2). Thereby, the whole line has a very compact design. We succeeded in accommodating the whole technology in a minimum amount of space, without having to give up the advantages of large digital lines, such as the automatic cleaning of print-heads.

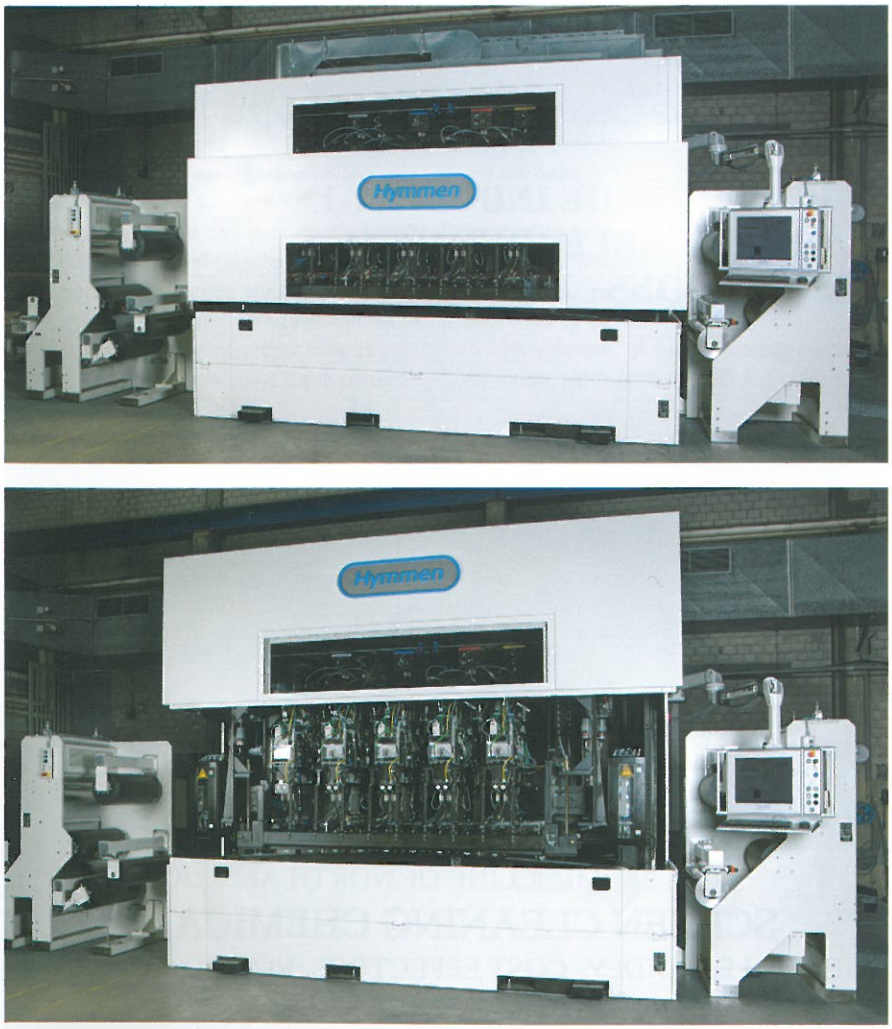


*Figure 1: showing cover closed (top) and cover open on the digital edge printing line Jupiter JPT-WS as a compact whole unit*

### THE VACUUM PRECISION CONVEYOR AS A RESULT OF ELABORATE R&D

Two of the 32 digital printing lines sold by Hymmen are the special type Jupiter JPT-WS for digital printing on edge bands. Significant research and development efforts had been undertaken as we had to find a solution to handle the special features of the substrate. This was finally found in the curved high-precision conveyor for edge material.

### TWO LINE VARIANTS: INLINE AND OFFLINE

The digital printing line JPT-WS is available in two production widths of 230mm and 560mm, with a differentiation between these variants inline and offline. Both types are available for integration within an existing edge band production line with extrusion and liquid coating machines. Printing takes place on a single track, which is borderless over the whole edge band at a maximum effective printing width of 205mm and 410mm respectively. In the case of the inline variant, the primer, basic lacquer and, if required, the texture are applied on the edge belt. The digital printing is followed

| Synthetic edges | Gravure printing | Digital printing |
|---|---|---|
| Inline operation possible | usual | possible |
| Offline operation possible | possible | possible |
| Usual maximum printing width | 400 mm | 410 mm / 205 mm / 137 mm |
| Loss of time due to change of decor (roller change, color change) | high | low |
| Loss of material due to change of decor (edge band, flushing losses..) | high | low |
| Color-matching/re-matching time requirement | high | low |
| Printing on textured material | conditionally possible | possible |
| Storage/roller costs | necessary | not necessary |

*Figure 2: the comparison between digital and gravure printing*


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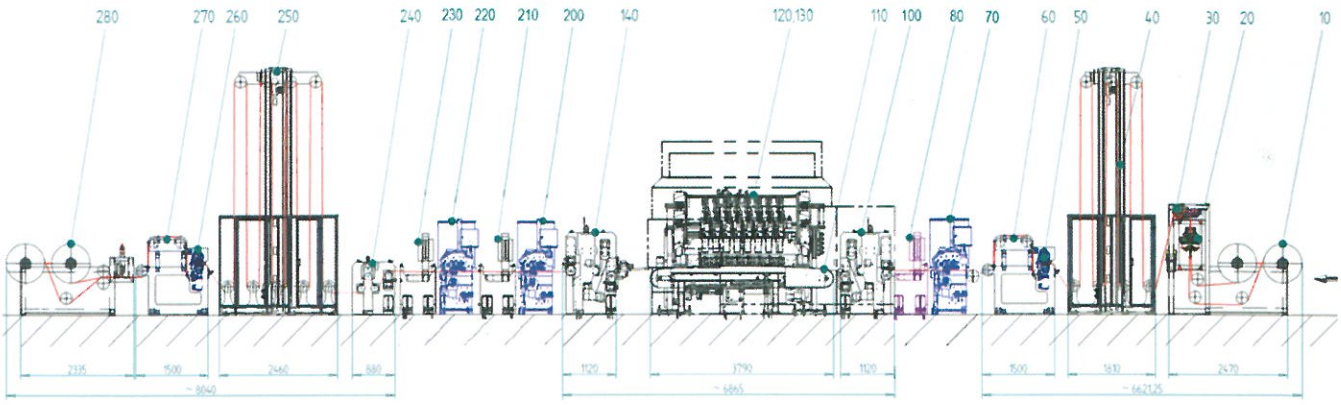


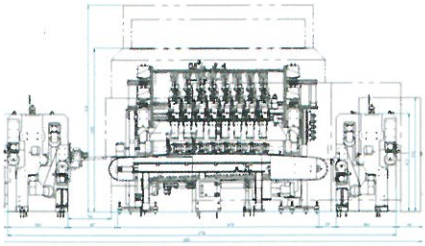

*Figure 3: inline and offline layouts*

by the coating lacquer and profiling, as this was not carried out before. At the end of production, the edge band is wound up on rolls and supplied to the end customer.

However, these lines can be also installed offline as independent printing machine. In this case it contains a rewinding and an unwinding station (compare figures 3a and 3b). All edge printing lines are very compact and do not need a lot of space in the production area. With the calender in front of the digital printer and the calender behind it and the vacuum precision conveyor, the wide line installed inline is approx. 7.50m long, 3.70m high and 2.70m deep, for example. With a printing speed of 25 to 50m/minute, edge belts of up to 4mm thickness can be printed. The edge band travels approximately 13m in the Hymmen line, including the 'loops' along the calender. If this happens with a speed of 50m/second, the belt is digitally printed and dried within 16 seconds. The materials to be processed are PP, ABS or PVC edge bands before or after they are cut to size.

## TECHNICAL AND ECONOMIC HIGHLIGHTS

In addition to the high precision conveyor which ensures the flatness of the substrate by means of the vacuum suction, the digital printing machine for edge bands offers further technical highlights. The modular width extension implies flexibility with regard to the printing widths. The self-recovery function ensures a very high line availability. Calenders within the Hymmen line enable a decoupling of the web tension within the digital printer from the web tension in the periphery. The greyscale technology ensures a

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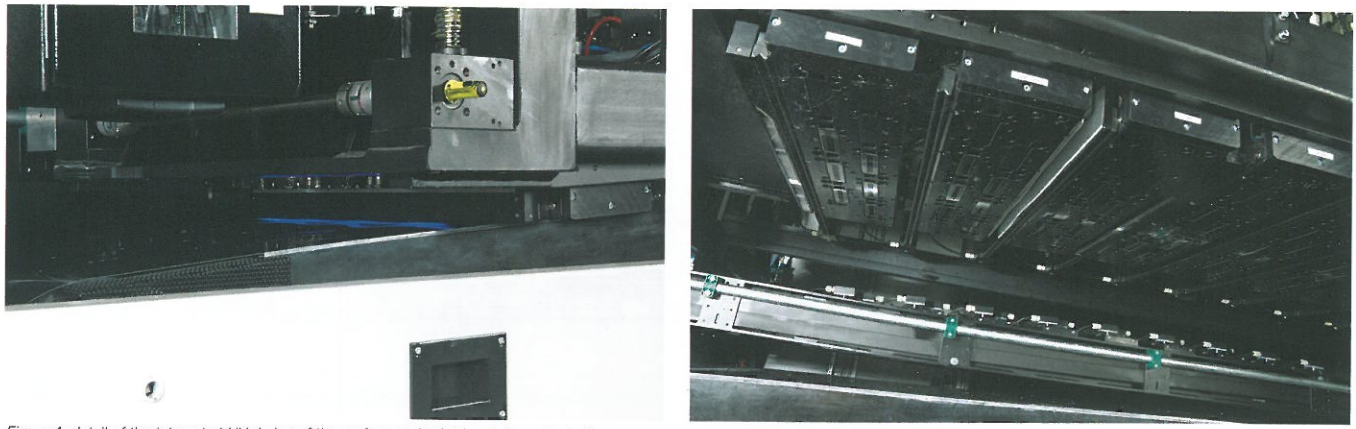

Figure 4: detail of the integrated UV drying of the surface and print-heads from the bottom

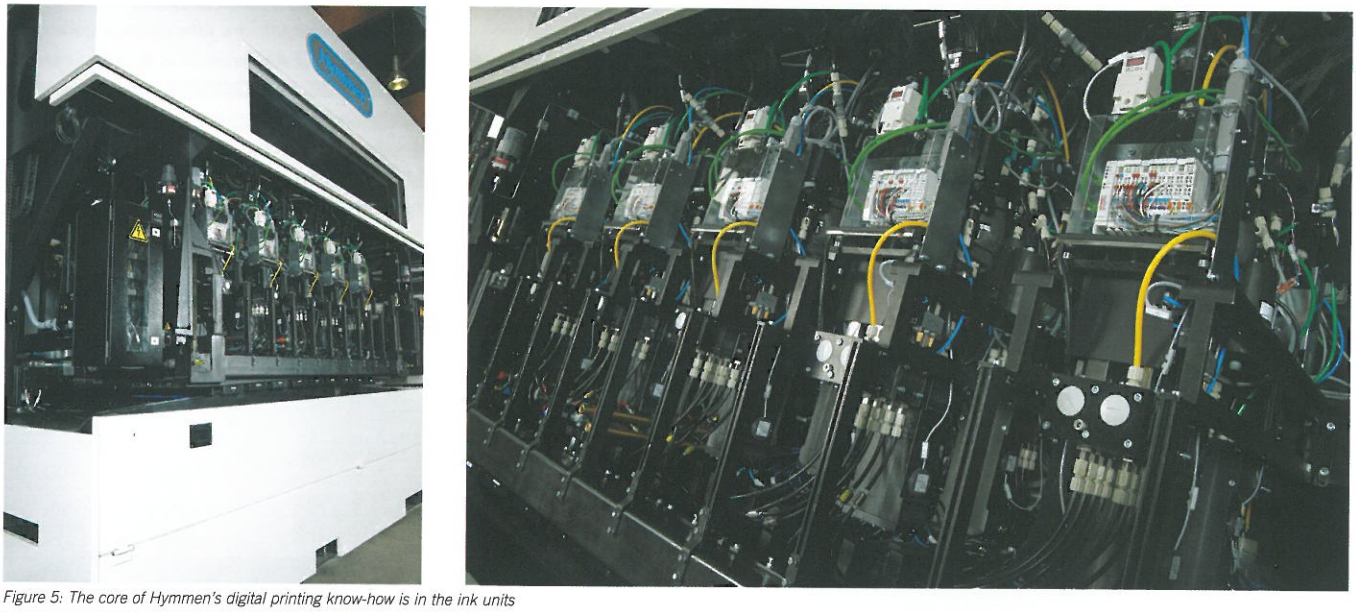

Figure 5: The core of Hymmen's digital printing know-how is in the ink units

print image is reliable and uniform in high-definition quality up to the edge border, while the colour management is easy to handle at the same time. A maximum ten colour rows with six print-heads side by side, as in 60 print-heads altogether, can be installed. The UV colours of CMYK x 2 and two special colours (typically white) are used. Finally, a UV-LED drying technology is used, saving resources (compare figure 4).

The line control and programming are generated in-house, just like for all Hymmen lines. The special know-how about ink supply and print-head activation, which we have developed ourselves, are already successful on the market. The print units consist of countless single parts which have already been installed in-house more than 600 times (compare figure 5). Not for nothing, our company calls itself 'Your established partner for industrial ink-jet'.

But Hymmen is not only pioneering technically and technologically with the digital printing lines. Also from an economic view, the lines represent a highlight – exemplary calculations and practical experience have shown that even without financial evaluation of the advantages, like storage cost reduction (capital commitment), logistics costs reduction, omission of costs for cylinder production, shortening of the internal processing time (time to market), the production is absolutely economically beneficial in cost when compared with gravure printing.

The result is that Hymmen digital printing technology offers an amazing optical deep structure of each possible edge décor (compare figure 6) and, where applicable, also with textured haptics. These can hardly be distinguished from genuine wood, with the highest décor quality like the surface, reproducible any time, and all in a highly flexible and economic production process. ■

Figure 6: Digitally printed edge bands showing décor variants


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